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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,399	08/28/2001	Yasushi Takatori	080974	6150

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EXAMINER	
HASHEM, LISA	
ART UNIT	**PAPER NUMBER**
2645	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/941,399	TAKATORI ET AL.	
	Examiner	Art Unit	
	Lisa Hashem	2645	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 11-24 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made of claims 1-10 **without** traverse in the reply filed on 1-18-2005.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "103" has been used to designate both 'intensive control station' and 'toll center'. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1, 3, 6, and 8 are objected to because of the following informalities: The claims include reference numbers e.g. (102). Appropriate correction is required.

4. Claims 5 and 10 are objected to because of the following informalities: The sentence 'Assume communication between nth base station and mth terminal station' does not end with a period (.). Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4-7, 9, and 10 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. Patent Application Publication No. 2003/0171134 by Doi et al, hereinafter Doi.

Regarding claim 1, Doi discloses an adaptive antenna control method used for a radio communication system or PDMA system (section 0006, lines 1-10; section 0038, line 1 – section 0053, line 2; Fig. 10) built by a plurality of radio base stations (Fig. 10: 1, 6) and a plurality of terminal stations (Fig. 10: 4, 8) capable of communicating with the radio base stations, each radio base station including an adaptive antenna having a plurality of antenna elements (Fig. 5: #1 thru #4; Fig. 10, 2), a distributor (Fig. 5, 38.1) for generating signals to be input to the plurality of antenna elements by branching a signal of one system to be transmitted, and weighting circuits for respectively weighting transmission signals to the plurality of antenna elements (Fig. 5: 15-1.1 thru 15-1.4), characterized in that for reception by each terminal station, an interference wave power or reception power of the desired wave (section 0179, lines 1-8) given by the transmission signal from each of the plurality of radio base stations is estimated, and a weight in the adaptive antenna of each radio base station is determined to minimize a sum of square errors between reception signals and desired signals for all the radio base stations

(section 0163, line 1 – section 0166, line 5) which simultaneously use the same communication channel (section 0148, line – section 0179, line 8).

Regarding claim 2, a method according to claim 1, wherein Doi further discloses a predetermined known signal is transmitted from each of the plurality of radio base stations to each terminal station (section 0152, line 1 – section 0153, line 5), and in each terminal station, a transfer function is obtained for each radio base station by checking a correlation between the known signal and the reception signal actually received from each radio base station (section 0154, line 1 – section 0155, line 4), and the interference wave power is estimated on the basis of the transfer function (section 0156, line 1 - section 0179, lines 1-8).

Regarding claim 4, a method according to claim 2, wherein Doi further discloses a sum result obtained by totaling, for all the antenna elements, for all the radio base stations except a station which transmits a target signal, and for the plurality of terminal stations, the interference wave powers obtained from the transfer functions obtained for the antenna elements of the radio base stations and the weights applied to the antenna elements in transmission is used as an evaluation value of the interference wave power (section 0156, line 1 – section 0162, line 2; section 0179, lines 1-8).

Regarding claim 5, a method according to claim 2, wherein Doi further discloses equation (1) representing a weight vector Wd(n) or $W^{(1)}(i)$ of a transmission system, which is to be given to the weighting circuit of the adaptive antenna of an nth radio base station, and equation (2) representing a gain G(m) or $R_{xx}(i)$ of an mth terminal station, which is obtained by a directional pattern generated by the adaptive antenna, are alternately repeatedly calculated, and the weight vector Wd(n) of a calculation result which has converged is given to each weighting

circuit (see equations (16), (20), and (21); section 0156, line 1 – section 0174, line 6). Assume communication between nth base station and mth terminal station (equations (1) and (2) omitted for brevity).

Regarding claim 6, Doi discloses an adaptive antenna control method used for a radio communication system or PDMA system (section 0006, lines 1-10; section 0038, line 1 – section 0053, line 2; Fig. 10) built by a plurality of radio base stations (Fig. 10: 1, 6) and a plurality of terminal stations (Fig. 10: 4, 8) capable of communicating with the radio base stations, each radio base station including an adaptive antenna having a plurality of antenna elements (Fig. 1: #1 thru #4; Fig. 10, 2), weighting circuits for respectively weighting reception signals of the plurality of antenna elements (Fig. 1: 12-1.1 thru 12-4.1), and a signal combining circuit (Fig. 1, 13.1) for combining the reception signals of the antenna elements weighted by the weighting circuits (section 0083, lines 1-11), characterized in that for reception by each radio base station, an interference wave power given by a transmission signal from each of the plurality of terminal stations is estimated, and at least a weight in the adaptive antenna of each radio base station and a transmission power of each terminal station are determined to minimize a sum of square errors between reception signals and desired signals for all the terminal stations which simultaneously use the same communication channel (section 0110, lines 1- 10; section 0148, line 1 – section 0179, line 8).

Regarding claim 7, a method according to claim 1, wherein Doi further discloses a predetermined known signal is transmitted from each of the plurality of terminal stations to each radio base station, and in each radio base station, a transfer function is obtained for each terminal station by checking a correlation between the known signal and the reception signal actually

received from each terminal station, and the interference wave power is estimated on the basis of the transfer function (section 0111, line 1 – section 0133, line 7; section 0148, line 1 – section 0179, line 8).

Regarding claim 9, a method according to claim 7, wherein Doi further discloses a sum result obtained by totaling, for all the antenna elements, for all the terminal stations except a station which transmits a target signal, and for the plurality of radio base stations, the interference wave powers obtained from the transfer functions obtained for the antenna elements of the radio base stations and the weights applied to the antenna elements of a receiving station is used as an evaluation value of the interference wave power (section 0111, line 1 – section 0133, line 7; section 0175, line 1 – section 0179, line 8).

Regarding claim 10, a method according to claim 7, wherein Doi further discloses equation (3) representing a weight vector Wu(n) or W_1 of a reception system, which is to be given to the weighting circuit of the adaptive antenna of an nth radio base station (section 0099, line 1 – section 0100, line 3), and equation (4) representing a transmission power Gt(m) or R of an mth terminal station are alternately repeatedly calculated, and the weight vector Wu(n) of a calculation result which has converged is given to each weighting circuit (section 0111, line 1 – section 0125, line 6; section 0175, line 1 – section 0179, line 8). Assume communication between nth base station and mth terminal station (equations (1) and (2) omitted for brevity).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doi, as applied to claim 1, and in further view of JP Publication No. JP020011285163A by Kasami et al, hereinafter Kasami.

Regarding claim 3, a method according to claim 2, wherein Doi does not disclose an intensive control station.

Kasami discloses an adaptive antenna control method used for a radio communication system built by a plurality of radio base stations and a plurality of terminal stations or mobile stations capable of communicating with the radio base stations, each radio base station including an adaptive antenna having a plurality of antenna elements (see Abstract), comprising: a transfer function (signal) obtained in each terminal station is transferred to an intensive control station or control station connected to each of the plurality of radio base stations through a wired communication line or wireless communication channel, and the intensive control station determines the weight in the adaptive antenna of each radio base station (see Abstract; section 0013, line 1 – section 0021, line 4).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the adaptive antenna control method of Doi to include an intensive control station as taught by Kasami. One of ordinary skill in the art would have been lead to make such

a modification since the intensive control station controls the plurality of base stations and the plurality of terminal stations and calculates the weight in the adaptive antenna of each radio base station.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Doi, as applied to claim 6, and in further view Kasami.

Regarding claim 8, a method according to claim 6, wherein Doi does not disclose an intensive control station.

Kasami discloses an adaptive antenna control method used for a radio communication system built by a plurality of radio base stations and a plurality of terminal stations or mobile stations capable of communicating with the radio base stations, each radio base station including an adaptive antenna having a plurality of antenna elements (see Abstract), comprising: a transfer function (signal) obtained by each radio base station (via a mobile station) is transferred to an intensive control station connected to each of the plurality of radio base stations through a wired communication line or wireless communication channel, and the intensive control station determines the weight in the adaptive antenna of each radio base station (see Abstract; section 0013, line 1 – section 0021, line 4).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the adaptive antenna control method of Doi to include an intensive control station as taught by Kasami. One of ordinary skill in the art would have been lead to make such a modification since the intensive control station controls the plurality of base stations and the plurality of terminal stations and calculates the weight in the adaptive antenna of each radio base station.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- The following patents disclose an adaptive antenna control method : U.S. Patent No. 6,087,986 by Shoki et al; U.S. Patent No. 6,512,917 by Hiramatsu; U.S. Patent No. 6,735,182 by Nishimori et al

11. Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Or faxed to:

(703) 872-9306 (for formal communications intended for entry)

Or call:

(571) 272-2600 (for customer service assistance)

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa Hashem whose telephone number is (571) 272-7542. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fan Tsang can be reached on (571) 272-7547. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-2600.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LH

lh
June 11, 2005

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